Region One
Vegetation Classification, Mapping, Inventory and Analysis Report

$$\bar{x} = \frac{\sum x}{n}$$

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Estimates of Old Growth and Snag Density on the Bitterroot National Forest

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Introduction

This document provides estimates of the percent of old growth for the Bitterroot National Forest using Forest Inventory and Analysis (FIA) data. All plots that had forested[1] conditions on the plot that were located on the Bitterroot National Forest were used. Those plots, in which wildfire or harvest have occurred since the 2000–2002 inventory until 2003, were coded to not meet the old growth definition or to count towards snag densities. This result in a conservative estimate of old growth and snags as not all wildfire and harvest activities remove all old growth or snags on the landscape. Geographic information system (GIS) coverages that depict wildfire and harvest activities are maintained by the Bitterroot National Forest. For more information contact the Forest GIS Coordinator.

As background to this report and for detailed information on FIA sampling methods and data, analysis techniques used, Northern Region old growth criteria, percent of old growth in the Region and by National Forests, see *Estimates of Old Growth for the Northern Region and National Forests* (Bush and others, 2006)

[1] "..land at least 10 percent stocked, or currently nonstocked but formerly having such stocking, with timber and/or woodland trees, and where human activity on the site does not preclude natural succession of the forest (i.e., the site will be naturally or artificially regenerated)." *Interior West Forest Land Resource Inventory Field Procedures, 1995-1996.*

Percent and Distribution of Old Growth on the Bitterroot National Forest

Tables 1, 2 and 3 provide a summarization of the estimates of percent of old growth on forested-lands for the Bitterroot National Forest as per the Northern Region's old growth definition (Green and others, 2005).

These estimates have changed since those reported in the March 7, 2006 report titled D*etailed Estimates of Old Growth and Snag Density on the Bitterroot National Forest.* This update is due to an oversight which was found when assessing old growth in the western Montana zone old growth forest type of alpine larch, whitebark pine, and limber pine. Previously, all plots that met old growth criteria for this forest type were not flagged as old growth. This has been corrected and estimates within this report reflect those changes.

Table 1: Bitterroot National Forest, Forest-wide estimate of percent of old growth and 90% confidence intervals

Forest	Percent Old Growth Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Total Num PSUs	Num Forested PSUs
Bitterroot	12.8	10.2	15.6	252	226

Table 2: Bitterroot National Forest estimates of percent of old growth and 90%-confidence intervals by Geographic Areas

Bitterroot Geographic Area	Percent Old Growth Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Total Num PSUs	Num Forested PSUs
Bitterroot	14.2	7.4	21.7	55	39
East Fork	14.7	7.2	22.9	34	34
Sapphire	10.0	5.0	15.6	38	36
Selway	10.1	5.9	14.9	75	69
West Fork	16.3	10.2	22.7	50	48

Table 3: Bitterroot National Forest estimates of percent of old growth and 90%-confidence intervals by Forest Plan Management Areas

Forest Plan Management Area	Percent Old Growth Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Total Num PSUs	Num Forested PSUs
1	14.4	7.5	22.1	32	32
2	6.0	0.9	12.4	21	20
3a	8.0	1.9	15.3	25	25
5	16.7	10.3	23.6	38	36
5,9	40.0	10.0	80.0	1	1
6	12.6	0.0	26.7	9	9
7	13.3	9.1	17.9	124	102
8a	0.0	0.0	0.0	2	1

Density and Distribution of Snags on the Bitterroot National Forest

Tables 4, 5 and 6 provide Forest-wide, Geographic Area, and Forest Plan Management Area summarizations of the average number of snags per acre on all forested lands on the Bitterroot National Forest for three diameter classes. The *10"+ class* shows the average number of snags per acre that have a DBH of 10 inches and larger. The *15"+ and 20"+ classes* show the average number of snags per acre 15.0 inches and larger and 20.0 inches and larger.

Table 4: Bitterroot National Forest, Forest-wide estimate of the average number of snags and 90% confidence intervals

Forest	SNAGS 10"+			SNAGS 15"+			SNAGS 20"+			Total Num PSUs	Num Forested PSUs
	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound		
Bitterroot	10.0	7.9	12.3	3.1	2.3	4.0	0.9	0.6	1.3	252	226

Table 5: Bitterroot National Forest of the average number of snags, standard error, and 90%-confidence intervals, by Geographic Area

Geographic Area	SNAGS 10"+			SNAGS 15"+			SNAGS 20"+			Total Num PSUs	Num Forested PSUs
	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound		
Bitterroot	15.1	9.2	22.0	5.4	2.9	8.6	1.5	0.6	2.5	55	39
East Fork	8.0	2.8	14.8	1.3	0.2	2.7	0.2	0.0	0.5	34	34
Sapphire	10.0	4.4	17.1	3.0	0.9	5.7	0.6	0.2	1.2	38	36
Selway	10.5	7.1	14.3	3.2	1.8	4.8	1.1	0.5	1.9	75	69
West Fork	6.5	3.5	10.0	2.4	1.1	4.0	1.0	0.4	1.7	50	48

Table 6: Bitterroot National Forest of the average number of snags, standard error, and 90%-confidence intervals, by Forest Plan Management Area

Forest Plan Management Area	SNAGS 10"+			SNAGS 15"+			SNAGS 20"+			Total Num PSUs	Num Forested PSUs
	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound	Snags per Acre Estimate	90%-Confidence Interval - Lower Bound	90%-Confidence Interval - Upper Bound		
1	3.3	1.1	6.1	0.4	0.0	1.0	0.3	0.0	0.8	32	32
2	2.4	0.4	5.1	1.5	0.2	3.1	1.3	0.1	2.9	21	20
3a	7.2	2.3	13.9	2.0	0.3	4.5	0.7	0.1	1.4	25	25
5	15.4	8.3	23.7	4.6	2.2	7.4	0.6	0.2	1.2	38	36
5,9	3.6	0.0	7.3	3.6	0.0	7.3	3.6	0.0	7.3	1	1
6	24.4	8.6	43.3	13.4	3.4	24.8	3.7	0.4	7.3	9	9
7	11.3	8.3	14.5	3.1	2.1	4.3	1.0	0.5	1.5	124	102

Literature Cited

Bush, Renate, D. Berglund, A. Leach, R. Lundberg, A. Zack. 2006. Estimates of Old Growth for the Northern Region and National Forests. Region 1 Vegetation, Classification, Inventory, and Analysis Report #07-06, May 2007, http://fsweb.r1.fs.fed.us/forest/inv/fia_data/analysis.htm

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Berglund, Doug, R. Bush, R. Lundberg, 2006. Region One Vegetation Council Classification Algorithms. Region 1 Vegetation, Classification, Inventory, and Analysis Report #05-01, Revised June 2006, http://fsweb.r1.fs.fed.us/forest/inv/classify/index.htm